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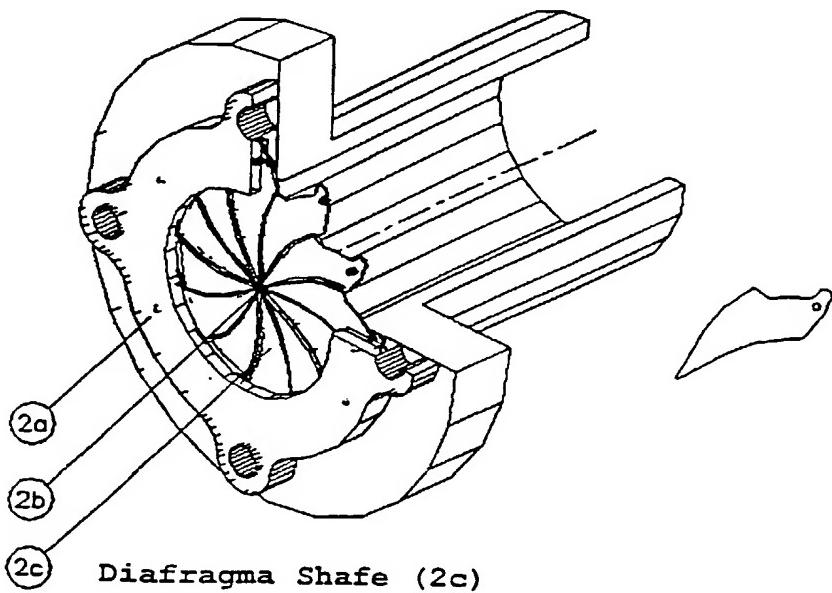
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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(54) Title: DIAPHRAGMED AIR VALVE SYSTEM



(57) Abstract: A diaphragmed air valve system for automotive engines which is designed for the purpose of keeping intact the shape as well as mass of an air body before and after entering the engine. This diaphragmed air valve system comprises a cylindrical air inlet (2a) and a valve opening (2b) constituted by a number of small plates of specific type and arrangement (2c). The small plates, with their specific type and aerodynamic arrangement, cause the formation of a number of openings in the centre of the air inlet when the valve is opened. The rate of air flowing into the engine is absolutely dictated by the diameter of the valve opening formed by the specific arrangement and type of the small plates.

WO 01/90552 A1

Description

## DIAPHRAGMED AIR VALVE SYSTEM

5    Technical Field of Invention

This invention relates to a diaphragmed air valve system used to set the air entering an internal combustion engine in such a way so that the shape as well as the mass 10 of the air keeps intact before and after entering the engine.

Background of invention

15        Automotive technology needs an engine of sound performance and handling. Car speed can be easily set if the fuel within the engine is entirely combusted. Numerous ways have been so far developed to manage the fuel combustion within the engine. Of them, the most common way is to 20 efficiently manage the air entering the combustion chamber.

Rate of air supplied into the engine is regulated by an air valve whose area of opening outside the engine can be set. In valves of current use, an intact air body is generally broken into two separated bodies once it enters 25 the engine. To make the shape as well as the mass of the air body unchanged, we need a valve whose opening always lies in the centre of the streamline. Opening of this type can be established only by means of diaphragm system.

30    Brief Description of the Invention

Diaphragmed air valve system on automotive engines is designed for the purpose of regulating air supplied into the engine in such a way so that the shape as well as the mass 35 of the air body is unchanged before and after entering the engine. An example of air valve of current use is shown in Figure 1. This air valve, which comprises a cylindrical inlet (1a) and a circular opening (1b), is rotatable along

the axis perpendicular to circular cross-section of the opening. Rate of air flowing into the engine is absolutely dictated by the angle through which the valve opening is opened.

5 Basic construction of the diaphragmed air valve system presently invented is shown in Figure 2. This diaphragmed air valve comprises a cylindrical inlet (2a) and a valve opening (2b) constituted by a number of small plates of specific type (2c) and arrangement. When opened, the valve 10 opening forms openings in the centre of the streamline. The rate of air flowing into the engine is controlled by the valve diameter formed due to the specific type and arrangement of the small plates (2c) constituting the valve opening.

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#### Brief Description of the Drawing

Figure 1 is an air valve comprising a cylindrical inlet (1a) and a circular opening (1b) which is of current use in 20 automotive engines.

Figure 2 is a diaphragmed air valve system comprising a cylindrical inlet (2a) and a valve opening (2b) constituted by a number of small plates (2c) whose type and pattern of arrangement control the area of the valve 25 opening.

Figure 3a is the separation or branching into two bodies of the initial intact air body within a cylindrical air valve.

Figure 3b is an intact air flow produced by the 30 diaphragmed air valve system presently invented.

#### Detailed Description of the Invention

One way of handling the rotation of an automotive 35 engine is to regulate the air supplied into the engine by using a valve attached on the air inlet of the engine. An example of an air valve of current use in automotive engines is shown in Figure 1. The air valve comprising a cylindrical

inlet (1a) and a circular opening (1b) which is rotatable along the axis perpendicular to circular cross-section of the opening. Rate of air flowing into the engine is absolutely dictated by the angle through which the valve 5 opening is opened.

Owing to the shape of the air valve of current use (Figure 1), the air passing through it will always be broken into two separated flows (Figure 3a). Due to losses, the mass of air flowing into the engine is greatly reduced.

10 Diaphragmed air valve system of present invention is designed for the purpose of setting the air flow in such a way so that the shape as well as the mass of air before and after entering the engine keeps intact.

15 Basic construction of the diaphragmed air valve system presently invented is shown in Figure 2. This diaphragmed air valve comprises a cylindrical inlet (2a) and a valve opening (2b) constituted by a number of small plates of specific type (2c) and arrangement which forms openings in the centre of the streamline when the valve is opened. The 20 rate of air flowing into the engine is dictated by the valve diameter formed by the arrangement of the small plates (2c) constituting the valve opening.

25 Description and drawings disclosed are intended merely as illustration, not as limitation. Modifications are always possible for the people skilled in the art as long as they are still within the scope of the invention.

## Claim

1. A diaphragmed air valve system for automotive engines characterized in such a way by
  - 5           a cylindrical air inlet and a valve opening constituted by a number of small plates of specific type and aerodynamic arrangement,
  - an air streamline which always lies in the centre of the air inlet, and
  - 10          air whose rate of flow into the engine is absolutely dictated by the diameter formed by the specific aerodynamic arrangement of plates constituting the valve,
  - so that the air flowing into the engine through the
  - 15          valve system keeps intact before and after entering the engine.

**AMENDED CLAIMS**

[received by the International Bureau on 28 March 2001 (28.03.01);  
original claim 1- replaced by amended claim 1 (1 page)]

1. A diaphragmed air valve system for automotive engines characterized in such a way by
  - 5 a cylindrical air inlet and a valve opening constituted by a number of small plates, at least three in number, of polygonal shape which are linked each other in a such aerodynamic arrangement so that they can dictate the size of the valve opening,
  - 10 an air streamline which always lies in the centre of the air inlet, and air whose rate of flow into the engine is absolutely dictated by the diameter formed by the specific aerodynamic arrangement of plates
  - 15 constituting the valve, so that the air flowing into the engine through the valve system keeps intact before and after entering the engine.

1 / 2

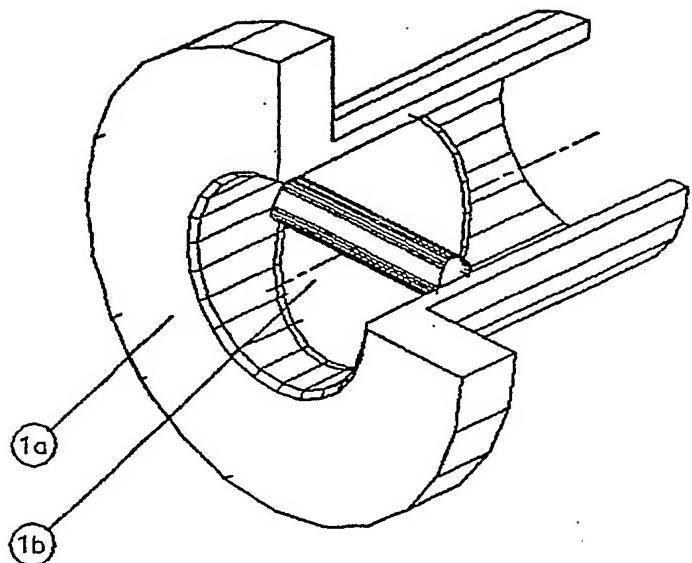


Figure 1

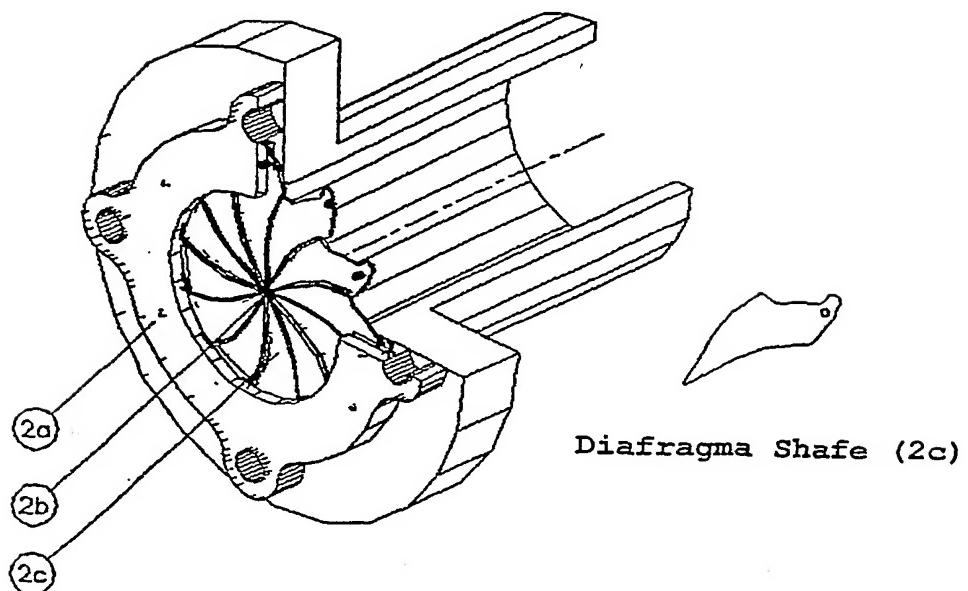


Figure 2

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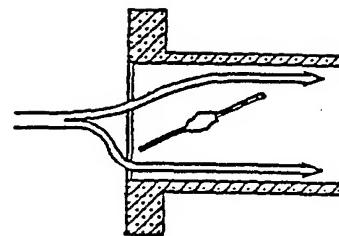
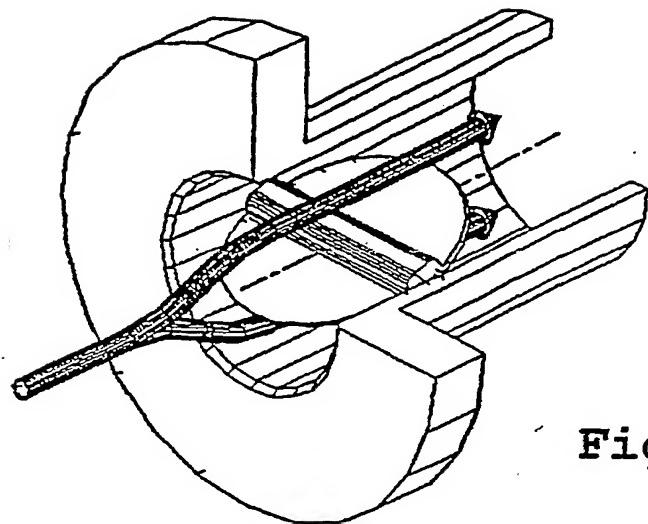


Figure 3a

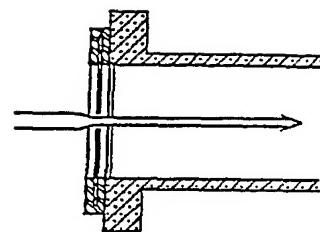
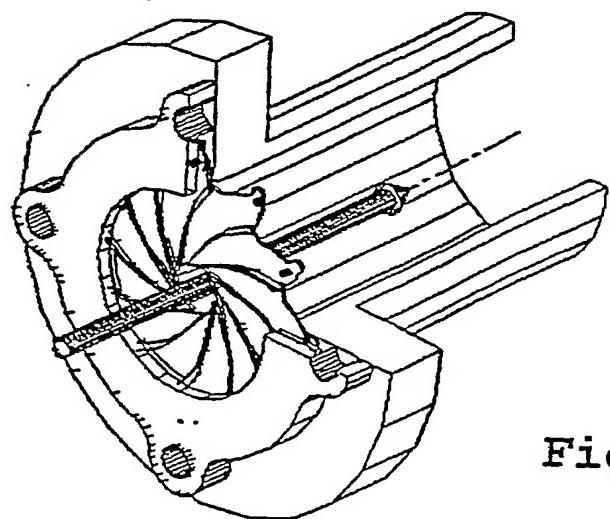


Figure 3b

## INTERNATIONAL SEARCH REPORT

Intel	al Application No
PCT/IB 00/01096	

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 F02D9/18
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
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Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F02D F02M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT
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Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 17907 A (TORRALBA GIMENO) 30 April 1998 (1998-04-30) abstract; figures 1-5 ---	1
X	WO 98 10187 A (CHAO) 12 March 1998 (1998-03-12) abstract page 9, line 21 - line 27 page 10, line 11 - line 17 page 11, line 4 -page 12, line 5 page 12, line 14 - line 19 page 13, line 25 -page 14, line 13 page 15, line 3 - line 7; figures 1-3 --- -/-	1

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the International search report
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18 January 2001

25/01/2001

Name and mailing address of the ISA	Authorized officer
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## INTERNATIONAL SEARCH REPORT

Inte	al Application No
PCT/IB 00/01096	

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 895 646 A (HOWAT) 22 July 1975 (1975-07-22) abstract column 2, line 19 - line 25 column 2, line 35 - line 41 column 2, line 46 - line 55; figures 1-3 ----	1
X	WO 95 19496 A (BAPTISTA) 20 July 1995 (1995-07-20) abstract page 3, line 8 - line 18 page 3, line 24 - line 35 page 4, line 10 - line 16; figures 1-4 ----	1
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A	US 2 725 075 A (IRGENS) 29 November 1955 (1955-11-29) column 1, line 62 -column 2, line 18 column 2, line 43 - line 50; figure 1 -----	1

## INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter	al Application No
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**DERWENT-ACC-NO:** 2002-041916**DERWENT-WEEK:** 200705*COPYRIGHT 2009 DERWENT INFORMATION LTD*

**TITLE:** Diaphragm air valve system has cylindrical air inlet and valve opening streamlining the center of the air inlet

**INVENTOR:** WIJAYA H; WIJAYA H P**PATENT-ASSIGNEE:** WIJAYA H [WIJAI] , WIJAYA H P [WIJAI]

**PRIORITY-DATA:** 2000ID-000089 (May 23, 2000) , 2002US-304726  
(November 25, 2002)

**PATENT-FAMILY:**

<b>PUB-NO</b>	<b>PUB-DATE</b>	<b>LANGUAGE</b>
WO 0190552 A1	November 29, 2001	EN
AU 200061763 A	December 3, 2001	EN
EP 1283948 A1	February 19, 2003	EN
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IN 200201151 P1	June 24, 2005	EN
MX 236518 B	May 4, 2006	ES
KR 537113 B	December 16, 2005	KO

**DESIGNATED-STATES:** AU BR CA CN IN JP KR MX SG US AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

**APPLICATION-DATA:**

<b>PUB-NO</b>	<b>APPL-DESCRIPTOR</b>	<b>APPL-NO</b>	<b>APPL-DATE</b>
WO2001090552A1	N/A	2000WO-IB01096	August 8, 2000
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US20030127618A1	N/A	2002US-304726	November 25, 2002
US 6896240B2	Based on	2002US-304726	November 25, 2002

**INT-CL-CURRENT:**

<b>TYPE</b>	<b>IPC</b>	<b>DATE</b>
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CIPP	F02D9/08 20060101
CIPS	F02D9/18 20060101
CIPS	F16K13/00 20060101

**ABSTRACTED-PUB-NO:** WO 0190552 A1

**BASIC-ABSTRACT:**

NOVELTY - The diaphragm air valve comprises a cylindrical air inlet (2a) and valve opening (2b) constituted by at least three small plates of polygonal shape which are linked in an aerodynamic arrangement (2c) to dictate the size of the valve opening. An air streamline lies in the center of the air inlet, and airflow is dictated by the formed diameter of the aerodynamic arrangement of the plates positioning the valve.

USE - For air intake of an internal combustion engine used in vehicles.

ADVANTAGE - Maintains the air in intact state before and after entering the engine.

DESCRIPTION OF DRAWING(S) - The drawing shows sectional perspective view of the diaphragm air valve .

Air inlet (2a)

Valve opening (2b)

Plate arrangement. (2c)

**CHOSEN-DRAWING:** Dwg.1/4

**TITLE-TERMS:** DIAPHRAGM AIR VALVE SYSTEM CYLINDER INLET OPEN STREAMLINED

**DERWENT-CLASS:** Q51 Q52 Q66

**SECONDARY-ACC-NO:**

**Non-CPI Secondary Accession Numbers:** 2002-031120